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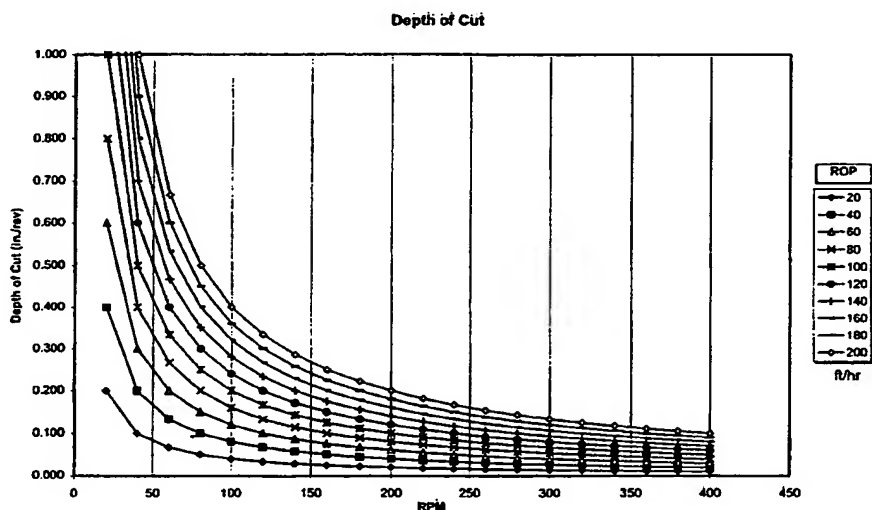
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(54) Title: **METHOD FOR OPTIMIZING THE BIT DESIGN FOR A WELL BORE**



(57) Abstract: A drill bit is designed to achieve optimum performance in a specified drilling application defined by the drilling system, the formation to be drilled and the configuration of the bore hole. A depth of cut versus predicted torque for a basic bit configuration is evaluated (Fig. 1) for different configurations of the drill bit. A computer modeling program is used to obtain the predicted torque for the basic bit configuration, and its modifications (Fig. 2). Features of the bit design are changed to achieve the lowest predicted torque for an optimum depth of cut. Presenting the computer analysis as depth of cut versus predicted torque for the bit design simplifies the design selection process. The formation being drilled may be evaluated by comparing actual torque with predicted torque for a given rate of penetration (Fig. 3). The evaluation can be used to confirm the computer model and determine formation properties.

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INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/50
US CL : 703/7, 10; 702/9

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 703/7, 10; 702/6, 9; 175/327

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
IEL/IEEE; STN; USPATFULL; INSPEC; EUROPATFULL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A, E	US 6,233,524 B1 (HARRELL et al) 15 May 2001, Background of the Invention, Summary of the Invention.	1-33
A, E	US 6,213,225 B1 (CHEN) 10 April 2001, Background and Summary of the Invention.	1-33
X, E	US 6,169,967 B1 (DAHLEM et al) 02 January 2001, Background of the Invention, Summary of the Invention.	1-33
X, P	US 6,021,859 A (TIBBITTS et al) 08 February 2000, Background of the Invention, Summary of the Invention.	1-33
A	US 5,787,022 A (TIBBITTS et al) 28 July 1998, Background of the Invention, Summary of the Invention.	1-33

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents.	"I" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"N" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	HANCKE et al., G.P. A Control System for Optimizing Deep Hole Drilling Conditions, 1991 International Conference on Industrial Electronics, Control and Instrumentation, 1991, pages 2279-2284.	1-33
A	HANCKE, G.P. The Effective Control of a Deep Hole Diamond Drill, Conference Record of the Industry Applications Society Annual Meeting, IEEE, 1991, pages 1200-1205.	1-33
A	SHERRATT, R.S. Use of the LMS Adaptive Signal Processing Technique to Improve Signal Data Rates from Practical Oil Well Logging Equipment, International Conference on Simulation '98, 1998, pages 350-353.	1-33

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